

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Schiffbauer

Application No. Not yet assigned

Filed: Concurrently herewith

For: NON-DIRECTIONAL MAGNET FIELD BASED  
PROXIMITY RECEIVER WITH MULTIPLE  
WARNING AND MACHINE SHUTDOWN  
CAPABILITY

BOX PATENT APPLICATION  
COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

**PRELIMINARY AMENDMENT**

Prior to examination, please amend the above application as follows:

In the Specification:

At page 1, line 3, add this paragraph:

**--Related Application Information**

This patent application claims the benefit of provisional U.S. Patent Application No. 60/243,641, filed October 26, 2000, which is hereby incorporated herein by reference.--

Page 2, replace the paragraph starting at line 14 with the following:

So, especially in the close quarters of a mine entry, it is important to know, as precisely as possible, when the operator or other personnel are within a safe distance of operating machinery or when they have entered the danger zone. To that end, U.S. Patent No. 5,939,986 entitled "Mobile Machine Hazardous Working Zone Warning System" to Schiffbauer et al., issued August 17, 1999, teaches a warning system for mobile working machinery that includes loop antennas that are distributed about mining machinery to define a warning zone. The direction of the radiation from each loop is perpendicular to that loop. The shape of the zone is determined by the shape of each loop antenna field decreases with one over the cube of the distance from the loop. A personnel warning device and receiver is worn by a protected

individual and includes a single ferrite loop antenna that receives the signal as a person enters the field.

Page 2, replace the paragraph starting at line 29 with the following:

While the system taught in Schiffbauer et al. provides some warning to the wearer, it does not provide positional accuracy because both the loop radiation and the receiver antenna are directional. At any distance from the loop, signal strength is maximum when the receiver antenna is parallel to the loop and is minimum when the receiver antenna is perpendicular to the loop. So, signal strength varies depending upon the direction of the single receiver antenna to the loop antenna, at any given distance from the loop. Thus, it is difficult to determine whether the signal strength is due to antenna alignment or distance from the loop.


Page 6, replace the paragraph starting at line 16 with the following:

The three dimensional arrangement of directional antennas 108, 110, 112 insures that even when one of the antenna 108, 110, 112 is aligned perpendicularly with the loop (i.e., its minimum signal alignment), the other two antennas are at, or near to, 90 degree angles to the loop, receiving the maximum signal. Since the sum of the three signals is dependent on the strength of the individual signals, the sum at the output of 3-way adder 126 is relative to the nearness of the proximity receiver 100 wearer to the source of the signal being received. Thus, the output of 3-way adder 126 is a first order indication of the potential danger to the wearer.

Respectfully submitted,

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By

  
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**Marked-up Version of Amended Specification  
Pursuant to 37 C.F.R. §§ 1.121(b)-(c)**

Page 1, line 3, add this paragraph:

**--Related Application Information**

This patent application claims the benefit of provisional U.S. Patent Application No. 60/243,641, filed October 26, 2000, which is hereby incorporated herein by reference.--

Page 2, line 14:

So, especially in the close quarters of a mine [shaft]entry, it is important to know, as precisely as possible, when the operator or other personnel are within a safe distance of operating machinery or when they have entered the danger zone. To that end, U.S. Patent No. 5,939,986 entitled "Mobile Machine Hazardous Working Zone Warning System" to Schiffbauer et al., issued August 17, 1999, teaches a warning system for mobile working machinery that includes loop antennas that are distributed about mining machinery to define a warning zone. The direction of the radiation from each loop is perpendicular to that loop. The shape of the zone is determined by the shape of each loop antenna field decreases with one over the cube of the distance from the loop. A personnel warning device and receiver is worn by a protected individual and includes a single ferrite loop antenna that receives the signal as a person enters the field.

Page 2, line 29:

While the system taught in Schiffbauer et al. provides some warning to the wearer, it does not provide positional accuracy because both the loop radiation and the receiver antenna are directional. At any distance from the loop, signal strength is maximum when the receiver antenna is [perpendicular]parallel to the loop and is minimum when the receiver antenna is [parallel]perpendicular to the loop. So, signal strength varies depending upon the direction of the single receiver antenna to the loop antenna, at any given distance from the loop. Thus, it is difficult to determine whether the signal strength is due to antenna alignment or distance from the loop.

The three dimensional arrangement of directional antennas 108, 110, 112 insures that even when one of the antenna 108, 110, 112 is aligned [in parallel]perpendicularly with the loop (i.e., its minimum signal alignment), the other two antennas are at, or near to, 90 degree angles to the loop, receiving the maximum signal. Since the sum of the three signals is dependent on the strength of the individual signals, the sum at the output of 3-way adder 126 is relative to the nearness of the proximity receiver 100 wearer to the source of the signal being received. Thus, the output of 3-way adder 126 is a first order indication of the potential danger to the wearer.